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Leaf anatomical structure in Arabidopsis thaliana (L.) Heynh. mutants deficient in photoreceptors

Vladimirovna D., Petrovna Y.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

Light is one of the major environmental factors affecting plants growth and development. For the reception of light signals, photoreceptors are used, activating complex signaling pathways which modulate plant's life strategy. The isolation of individual or multiple photoreceptor-deficient plant mutants provided valuable insights into photoreceptors functions, including the effects on plant architecture. However, available information on the leafanatomy in such mutants is very limited. Here, we characterized leaf anatomical structure of model plant Arabidopsis thaliana (L.) Heynh. Individual mutants deficient in phytochromes, cryptochromes, and phototropin were compared to the wild type control variant. We analyzed the patterns of distribution of different tissues and vascular bundles in the leaves and calculated the total leaf areas, vascular bundles and individual tissues areas, as well as leaves thickness. The results indicated asignificant increase in tissue areas in the mutantscry1 and phot1, while in phyB mutants, the leaf lamina was slightly underdeveloped and smaller than that of the control Lervariant.In cry2mutant, leaf area increased slightly, and in phyA somewhat larger leaves exhibited less developed central vascular bundle. Thus, the deficiency in blue or red light perceiving receptors might have an effect on the leaf structure in Arabidopsis thaliana, which is consistent with the previous observations reported elsewhere.

Keywords

Arabidopsis thaliana, Leaf anatomical structure, Leaf area, Mutants, Photoreceptors